Improvements relating to television audience research systems.

Publication number: EP0195639 (A2)
Publication date: 1986-09-24
Inventor(s): MEWES THOMAS [AU]
Applicant(s): MEWES THOMAS [AU]; MORGAN GARY C [AU]
Classification:
- international: ***H04N17/00; H04H20/31; H04H60/43;*** **H04N17/00; H04H1/00;** (IPC1-7): H04H9/00
- European: H04H60/43; H04H20/31
Application number: EP19860301944 19860317
Priority number(s): AU19850009788 19850318

Also published as:
NO860998 (A)
JP61269596 (A)

Abstract of **EP 0195639 (A2)**

System and apparatus for television audience research in relation to use of V.C.R., live T.V. or cable T.V., including a signature generator associated with an encoder related to a series of programmes or channels available to the television audience, apparatus to substitute the signature frequency for the UHF or VHF signals received by a television receiver tuner or V.C.R. tuner and apparatus already present in the T.V. or V.C.R. to accept the signature frequency to the exclusion of all others and a decoder collecting output intelligence contained in the signature to establish whether the T.V. or V.C.R. is switched to a particular program representative of the signature. The encoder may be variable to provide a sweep of frequencies and signatures representative of all channels in the viewing area and multiple decoders may be used one for each receiver feeding into a multiplexer.

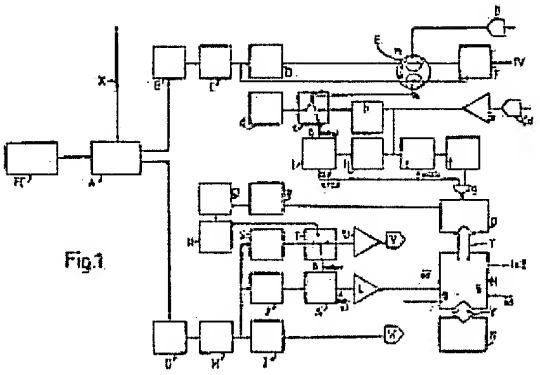


Fig.1

Data supplied from the ***esp@cenet*** database — Worldwide

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 195 639**
A2

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: 86301944.4

(51) Int. Cl.⁴: H 04 H 9/00

(22) Date of filing: 17.03.86

(30) Priority: 18.03.85 AU 9788/85

(43) Date of publication of application:
24.09.86 Bulletin 86/39

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: Mewes, Thomas
c/o The Roy Morgan Research Centre Pty.,Ltd. 499 Bourke Street
Melbourne Victoria 3000(AU)

(71) Applicant: Morgan, Gary C.
c/o The Roy Morgan research Centre Pty.,Ltd. 499 Bourke Street
Melbourne Victoria 3000(AU)

(72) Inventor: Mewes, Thomas c/o The Roy Morgan Res. Centre Pty. Ltd. 499 Bourke Street
Melbourne Victoria 3000(AU)

(74) Representative: Boydell, John Christopher et al,
Stevens, Hewlett & Perkins 5 Quality Court Chancery Lane
London, WC2A 1HZ(GB)

(54) **Improvements relating to television audience research systems.**

(57) System and apparatus for television audience research in relation to use of V.C.R., live T.V. or cable T.V., including a signature generator associated with an encoder related to a series of programmes or channels available to the television audience, apparatus to substitute the signature frequency for the UHF or VHF signals received by a television receiver tuner or V.C.R. tuner and apparatus already present in the T.V. or V.C.R. to accept the signature frequency to the exclusion of all others and a decoder collecting output intelligence contained in the signature to establish whether the T.V. or V.C.R. is switched to a particular program representative of the signature. The encoder may be variable to provide a sweep of frequencies and signatures representative of all channels in the viewing area and multiple decoders may be used one for each receiver feeding into a multiplexer.

EP 0 195 639 A2

Croydon Printing Company Ltd.

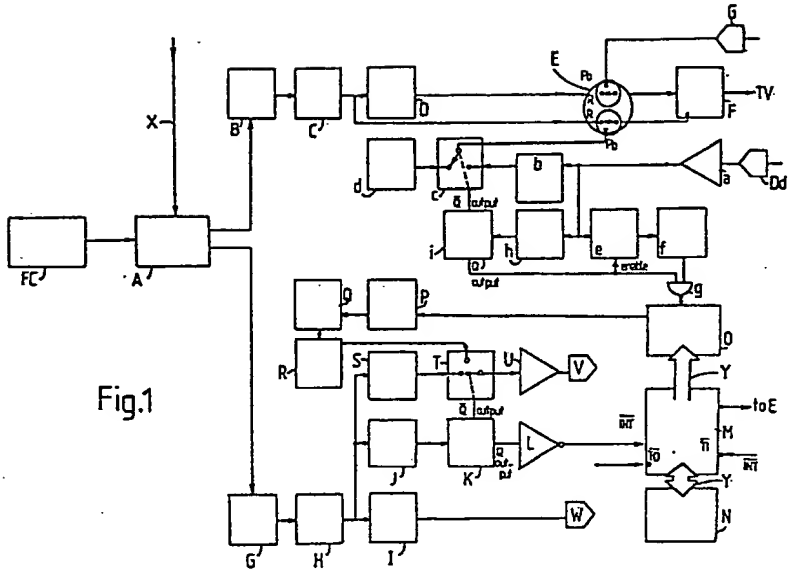

G
E
Pb
TV
F
X
B
C
D
Pb
d
b
a
Dd
i
h
e
f
throttle
g
FC
A
Q
P
O
R
S
T
U
V
Y
toE
J
K
L
M
N
W
G
H
I

Fig.1

IMPROVEMENTS RELATING TO TELEVISION AUDIENCE RESEARCH SYSTEMS

This invention relates to a system for collecting statistics for audience research into television use. In particular the invention relates to such systems to provide information in respect of programmes being currently transmitted as well as pre-recorded programmes being replayed in the home.

In collecting statistics for audience research into television use, it has been common practice to use a so called TV meter to determine and record which channel is being currently viewed so long as the programme being watched is an ON-AIR or live transmission at the time that it is actually being broadcast or is being transmitted currently via cable networks in real time.

The conventional TV meter has a severe limitation in respect of programmes which were pre-recorded some hours, days or weeks earlier than the time at which the viewer is playing back such a programme from a tape or other recording medium as would be the case when a video cassette recorder (V.C.R.) is in use. In such circumstances the conventional TV meter may be able to record that a V.C.R. was being used but it would be incapable of identifying the nature of the programme being played back even if the recording happened to be only a few minutes old. Neither could it identify the TV channel which had originally broadcast it or the cable channel in the case of cable TV.

Furthermore the conventional TV meter has another serious limitation namely that although it is able to record details of live ON-AIR transmissions currently being broadcast it is not able to identify individual advertisement as they are being seen ON-AIR. It is also unable to identify a V.C.R. playback of a particular advertisement being paid for by an advertiser for whom data is being collected by the audience researcher.

The invention has a prime objective, the provision of so-called V.C.R. TV meters for collecting statistics for use in audience research capable of recording exactly what programme is being watched live at the time the programme is being received in a viewers home or what programme is being played back.

Further objectives of the invention include means of establishing:

(i) The time a V.C.R. recording was made in the home.

(ii) The channel from which the recording was reproduced.

(iii) The identity of an advertisement being viewed live or during V.C.R. playback, or at the time the advertisement is being created.

(iv) With a single meter, a multiplicity of different channel identities all being viewed or recorded at a given moment by a multiplicity of TV receivers or V.C.R's sharing a common signal distribution network from antenna or cable.

Example 1. A V.C.R. television combination may be using two different channels at the same time, one to be recorded whilst the other channel is being watched.

Example 2. In a multi-set home several TV's may be in use at any given moment all watching different programmes.

In the ambit of this invention all of these objectives are attained using the one technique of injecting known codes (signatures) into the intelligence being received recorded or created; such codes to be recovered either instantaneously or at a later time as evidence of the events that the codes depict. By "signature" is meant a descriptive code or marker indicating a range of data or information.

There is provided according to the present invention a system of television audience research comprising the steps of applying subliminal marker codes into a television/V.C.R. installation encoding said marker codes detecting and decoding said codes in the television/V.C.R. installation in real or subsequent time to obtain information as to programmes or channels being watched recorded or played back, said codes permitting collection of a range of data for the purpose of audience research.

When the advertiser produces his advertisement in the laboratory or studio, subliminal codes may be added to the sound track. These codes may comprise an indentifier for the advertising company eg. a serial number to identify a particular advertisement in a series of many by the same advertiser. The coding is repeated frequently throughout the tape recording of the advertisement, say between 10 and 30 times, according to the duration of the advertisement, but more or less as may be deemed necessary.

The recording tape or film is then provided by the advertiser to the various television channels and cable networks which the advertiser has chosen to transmit his advertisement.

The codes could alternatively be coded subliminally using single frames of just one colour inserted into the picture information. By way of example only and not as the only method possible, a single red frame (say) followed by 50 advertisement frames followed by (say) a green frame and another 50 advert frames then (say) a blue frame and 50 more advert frames and so on ad infinitum could provide several hundred identifiers.

Yet again it would be practical to represent the codes as digital information between frames in the flyback period of the video information but this may not always be expedient.

Whatever the chosen method, it is only necessary to detect the codes superimposed upon the received signal at the television receiver and to reconstruct the information in a form suitable for recording in the meter memory for subsequent onward transmission or reporting to a central computer which can then look up the codes and determine the origin of the advertisement either being broadcast in real time or subsequently played back at some later time.

To this information, the V.C.R./TV meter may append additional encoded details of the date and time that the advertisement has been recorded, and from which channel, or from which cable service, the broadcast or transmission originated.

The same method is used in the invention to add subliminal codes to the recording medium of the V.C.R. or other recorder when in the process of taping an ON-AIR or ON-WIRE programme magnetically. Upon playback the detector, which is of the type or which could even be the same apparatus, used for recognising advertiser and advert codes will also recognise the codes appended by the V.C.R./TV meter. These codes though similar represent different data. This data could be a channel number code followed by a record serial number which also includes date or such other information of use to the audience researcher.

The need to provide such additional codes highlights a limitation of conventional TV meters which are capable of only a single channel determination at a time.

In a typical V.C.R. installation the television receiver may be tuned to one channel whilst the V.C.R. tuner is receiving programmes from a different channel for the purpose of recording.

Consequently two of the conventional type meters would be necessary. On the other hand this invention allows multiple channel identification at the one time using a single V.C.R./TV meter so that in fact any number of Television receivers or V.C.R's sharing a common antenna

system or cable system may be monitored by a single V.C.R/TV meter even if all receivers and tuners are tuned to different programmes at any one time.

At the time that the received broadcast is being recorded, the detector is on the alert for subliminal advertiser codes present on the received signal from the originating station or cable. These are allowed to pass directly to the recording head of V.C.R. unchanged and during these moments, the subliminal channel number code and record serial numbers generated repeatedly within the V.C.R./TV meter are inhibited so as to avoid confusion, or contamination of the coded information. The meter generated subliminal codes on the tapes, are constantly repeated whilst the playback is continuing so that at all times the V.C.R./TV meter is aware of the identity of the material (including advertisement) being played back and equally is aware of the source of the play-back, unless that source be a film or similar pre-recorded video cassette not received by direct electromagnetic radiation or by cable. In such event the V.C.R./TV meter identifies "VIDEO" being played back knowing it to be either a FILM or VIDEO by inference because these recordings will not contain any recognisable (to the V.C.R./TV meter) subliminal codes.

The invention will be described in greater detail having reference to the attached diagrams in which Figure 1 is a block diagram of a V.C.R./TV meter depicting those parts relating to the invention concept as will become clear later. Other more conventional aspects of TV meters are not shown.

Figures 1(a) and 1(b) show overall schematic arrangements of a V.C.R./TV meter.

Figure 2 shows a graphic representation of video signals played back from a V.C.R. on a frame by frame basis.

Figure 2a shows video signals to the TV receiver, the missing pulse 20 and grey blanking frame 21.

Figure 2b shows the FSK signals 22 to the modem from detector "e".

Figure 4 is a block diagram depicting apparatus for determining to what channel a TV receiver is tuned at a given moment.

Figure 5 is a detailed block diagram of the encoder of Figure 4.

Figure 6 shows a block diagram of a further preferred embodiment for use with a marker pulse.

Figure 7 is a block diagram of a multiple channel determination.

Figure 1(a) shows one possible arrangement for a V.C.R./TV meter embodying this invention. Figure 1(a) is an outline schematic only and its individual component parts are described in detail elsewhere in this specification in so far as they may relate to the novel features of the invention. The microprocessor or computer M controls the entire apparatus and processes the data gathered.

Under control of microprocessor or computer M, encoder A produces channel signatures at all the possible frequencies available to the television receiver TV and V.C.R. tuner VT and the broken line from encoder EA may carry confirmatory information back to microprocessor or computer M.

Each channel signature is a unique code representative of one of the channels herein called an A type code. This code is injected at IA into the radio frequency intelligence arriving from the antenna and for the purpose of this description it will be in the form of a sound modulated carrier but equally could be video modulated. When finally demodulated, either at points p or q the codes may then be decoded by the A-Type Decoder DA thus releasing back to computer or microprocessor M the identity of the channels to which V.C.R. tuner VT or television receiver TV are tuned even should they be different channels. Channel signatures for those channels not being

used are suppressed by the tuned circuits in the two receivers which are high frequency selective.

The channel code (A type) produced by the decoder DA is used, whenever the recorder is operating, to activate encoder EB and inject it at IB as a video modulated carrier. It could equally be a sound modulated carrier and constitutes a type -B code. This code is then impressed on the magnetic recording which is being made. Later when playback is operative the code becomes once again available and is recognised by decoder DB and hence passed to microprocessor M as an indication of the source (by channel identity) of the original recorded programme.

The microprocessor M also uses encoder EB to append date and time codes in addition to the channel code and when played back, all of this information describes the origins of the recorded programmes. These are all called B-Type codes.

Decoder DB has one other function and that is to decode additional information as to the programme being played back where such extra information has been encoded into the original transmission from a broadcast TV transmitter (or cable network source) as for example when an advertiser produces his video advertisement and encodes information to identify himself and his advertisement. In such a case the codes appended to the advertisement would need to be subliminal as are also the A and B type codes locally generated within the V.C.R./TV meter.

Typically the advertisers code would also be produced using the format of the locally generated B Type code if it were desired to use the same decoder DB although a different format and an extra decoder to match may be added to the meter. The advertiser may use an identical apparatus to that of the meter to produce his codes.

Figure 1(b) shows the respositioning of IA of figure 1(a) to suite injection into a cable system. All

other circuits and operations for cable TV are the same as described for figure 1(a).

EXAMPLES

1. In figure 1(a), should the television receiver TV be tuned to the frequency of modulator MD and the programme being watched is tuned by the V.C.R. Tuner VT being a different channel the two sets of information are delivered to the microprocessor M.

(i) That receiver TV is on the V.C.R. fixed channel; and

(ii) That the programme being watched is from channel 'n' as tuned in by the controls of the V.C.R.

2. In figure 1(b), the television receiver TV is always tuned to the frequency of the cable irrespective of the programme being watched. This not withstanding, two sets of information are again delivered to the microprocessor MPL

(i) That the receiver TV is set for cable viewing

(ii) That the programme being watched is from cable channel 'n'.

The A-Type codes are the mechanism used in both of the above examples to provide this information.

One portion of the preferred embodiment of the invention is the arrangement depicted in Figure 1.

This is a simplified block diagram of those parts of the V.C.R./TV meter which relate to the novelty aspects of the invention.

Other parts of the V.C.R./TV meter not included in the drawing are details of the control system for Tuning, the clock timer circuits, the controls for the tape deck, and the method of recording which members of the household are viewing. These are current state of the art and as such need no discussion here.

The arrangement of Figure 1 is mainly intended for those panel households which have their own V.C.R., though in another preferred version of the invention, the V.C.R.

portion would be an integral part of the V.C.R./TV meter to be installed by the researcher in a household elected for monitoring (panel member).

In the circumstances depicted by Figure 1, the household's own V.C.R. is partially demobilised as it will not have an antenna connected to its internal TUNER. The V.C.R. internal TUNER is replaced by TUNER G in the V.C.R./TV meter Figure 1. All recordings made OFF-AIR by the V.C.R. are made via TUNER G and its eventual outputs at V and W.

Yet another preferred arrangement includes interposing on RF Modulator between V and W and sending the output of the RF Modulator into the antenna socket of the V.C.R. which is then permanently tuned on its internal VCR TUNER to the frequency of the RF MODULATOR. Once again, all OFF-AIR recordings come via TUNER G in the V.C.R./TV meter Figure 1.

The household Antenna X in Figure 1 is connected to the two tuners B and G via a conventional booster splitter A, which will compensate for any cable losses within the wiring of the V.C.R./TV meter and to provide impedance matching.

FC in Figure 1 refers to an apparatus for injecting a marker pulse or a code (signature) for each channel in turn whilst at the same time tuning an oscillator to the frequency of that channel and injecting a subliminal marker or code into the stream of intelligence coming from source X (In this case the antenna or as an alternative a cable terminal device). The nature of FC is described later in this specification. Up to several hundred channels may be catered for by FC.

Tuner B, provides OFF-AIR programmes to the domestic TV receiver. Audio at D and Video at C are sent to RF Modulator F via switch E which is under the control of micro processor M.

Switch E is a double pole changeover switch, which may be either a relay or electronic. When viewing an OFF-AIR programme, this switch is thrown to the 'R' connection and the output of TUNER B, via processing circuits in C and D modulate the RF Modulator F to provide a signal in the VHF or UHF TV BANDS which enters the domestic TV receiver antenna terminal at some suitable channel, say 3 or 36, depending on local conditions in the area.

When switch E is thrown to the Pb connection, the play-back programme from the domestic V.C.R. Cd is made available to the domestic TV receiver for viewing by the household members. As the changeover of E is carried out by the microprocessor M, the latter always knows whether the "system" as a whole is in play-back or record mode as set by the viewer, or by the clock timer memory. "System" is defined as the composite of Domestic TV, Domestic V.C.R., V.C.R./TV meter and various local or remote controls.

The description of switch E contacts as Pb and R meaning play-back-mode and record-mode, does have some ambiguity of meaning.

In the so called RECORD mode the system may not actually be recording, but is available to do so if called upon.

In the RECORD mode, the TV viewer is actually watching the received signals from TUNER B whilst the programme to be recorded via TUNER G may be the same as for TUNER B, or some other channel selected by the viewer in both instances.

The RECORD procedure, when active, provides an Audio-out signal at W from where it is sent to the V.C.R. Audio-in terminal.

The Video-out signal at V, serves the V.C.R. in like manner to the Audio-out signal mentioned above, save that suitable data has been added by the V.C.R./TV meter.

In the version depicted by Figure 1, information to be encoded on the V.C.R. tape is transmitted to the V.C.R.

in a time sharing mode with the OFF-AIR programme to be recorded being received via TUNER G.

The means described here is not the only possible mechanism for coding the tape. In Figure 1 the coding is done at CHROMANANCE frequency within the Video information for the channel selected. It could equally be carried within the LUMINANCE FREQUENCY BAND or even the Audio Band via suitable filters on a separate track if the V.C.R. happens to be integral with the V.C.R./TV meter.

Video OFF-AIR signals from IF amplifier and detector, H are distributed to VERTICAL SYNC. SEPARATOR J and then the vertical pulses 23 (Fig. 2(b) depicting picture frame intervals are counted at K.

Counter K is preset to give an output impulse of one picture frame duration at predetermined intervals, say once every 30 seconds, but not necessarily so.

Video OFF-AIR signals also go to a fast diode switch T via a DELAY S. This delay may be as much as 64 μ.s. or greater, or as little as 250 n.s. Anything in excess of 64 μ.s may be undesirable, as the delay plays a limiting role, even though a non-critical one. In the process described, the purpose of the delay is to allow the diode switch T sufficient time to transit to its other input coming from OSCILLATOR R. The approximate frequency of R is 4 MHZ but not necessarily so.

In the quiescent state (as shown) switch T conveys the OFF-AIR video to the V.C.R. via buffer U and terminal V.

As determined by the counter K, at regular intervals $\overline{Q}$ goes low for one frame period and the switch T cuts off the OFF-AIR Video to the V.C.R. and instead switches it to oscillator R whilst preventing the vertical sync. pulse which initiated the transfer from reaching the V.C.R. In the period of the switch-over the microprocessor M receives an interrupt $\overline{INT}$ from the counter K via inverter L.

This causes the microprocessor to transfer data from its memory N to the Universal asynchronous transmitter (portion of UART) O via the DATA BUS Y.

In turn this data is serialised within O and passed to TX Modem P.

Figure 1 shows a Modem P which may be 1200 BAUD, but this modem can operate at any rate desired.

Modem P turns digital data streams from the UART O into frequency shift keying tones (FSK) which are passed to Modulator Q which in turn frequency modulates OSCILLATOR R.

Other preferred arrangements would permit alternative methods of modulation such as amplitude, phase shift, amplitude controlled phase shift keying to mention a few, and for different parts of the frequency spectrum to be used.

The data as selected by the microprocessor M is thus mixed into the OFF-AIR Video stream for the duration of one picture frame, but not necessarily for such a precisely defined period, e.g. ONE LINE of picture frame could be opted for. At the termination of the period whatever its duration, switch T reverts to the quiescent state when OFF-AIR Video is once again channeled out to the V.C.R.

The result is that hidden within the picture signals being recorded, a data stream is also recorded and the data repeats or changes each time it is written on tape, say once every 30 seconds by way of example.

At a subsequent play-back of this recording, the V.C.R. produces Audio which is fed to switch E and then to the domestic TV receiver via RF Modulator F.

The Video signal from the V.C.R. enters the V.C.R./TV meter via Buffer 'a' and is distributed three ways.

Its normal path is via delay 'b', say of 64 µ.s. The purpose of the delay is to allow time for the missing pulse detector 'i' to detect the start of the frame containing coded information and to change-over the fast

diode switch 'C' in time to prevent coded information going to the TV receiver via the RF modulator F.

During the frame time when coded information arrives from the V.C.R., a blanking frame 21 at grey signal (see Figure 2(a)) level and frequency is inserted into the video stream which goes to the domestic TV. This grey signal is provided by OSCILLATOR 'd' under control of the missing pulse detector, 'i' ($\bar{Q}$ output). Another version of the invention dispenses with this feature altogether. As soon as pulses 23 from the VSYNC extractor 'h' resume, then the switch 'c' reverts to its normal quiescent state supplying Video from the V.C.R. to the RF Modulator F and hence to the domestic TV receiver.

Detector 'e' monitors the Video content arriving from the V.C.R., whenever it is enabled by a signal from the Q output of the missing pulse detector 'i' which also enables gate 'g'.

The output of detector 'e' reproduces the frequency shift keying tones originally put on tape from TX Modem P, whenever they may be played back through the system.

These are translated to data bit streams by the RX Modem 'f', and passed to the universal asynchronous receiver O (the other part of UART) via gate 'g'.

UART O conveys the data to memory N via the micro-processor M.

Suitable codes are generated by the microprocessor M when recording is taking place.

Typical examples of the codes used in a V.C.R./TV meter would be for

(a) Date and time of recording

(b) Channel being recorded

(c) Number of recordings made that day

(d) Recordings initiated by Timer Memory.

although these are not the only codes or information which the invention intends.

With reference to Figures 2, 2a and 2b, the description for Figure 1 would result in only 2 characters of 8 bits each (TWO BYTES) or 4 Binary coded decimal characters in one frame.

More characters would require higher Baud Rates or with the Baud Rate remaining at 1200, several frames at suitably designated intervals would be required.

Note: It is intended in the preferred system of Figure 1 that complete codes would be repeated at regular intervals along the tape for the entire duration of the recording, although not necessarily so.

It may happen that different codes are added to the video signals. One example of such a code would be that of a particular Advertiser, when creating his advertisement for distribution by commercial TV channels.

With reference to Figure 3, Advertiser Codes are received OFF-AIR and the Video Signals containing them are fed to Detector 'e' Figure 1 and V Sync. extract 'h' Figure 1, or when the system is in either play-back or record mode via 'ADD' 1 Figure 3.

For video from either source, the paths to the left of ADD 1 go to Missing Pulse Detector 'i' Figure 1 and to Address Decoder 2. The appropriate one will detect data present. For play-back video the description for Figure 1 applies.

For OFF-AIR-Video the grey frequency band is filtered out by narrow band NOTCH FILTER 3 and the resulting signals are applied to decoder 2.

When decoder 2 recognises an address it has been programmed to receive it enables COUNTER 4.

This counts the number of FRAMES specified by the system designers as heralding the arrival of an OFF-AIR DATA FRAME at some later point in time or it may actually be that data and address are in the same frame.

The predetermined output of counter 4 enables Detector 'e' Figure 1 and gate 'g' Figure 1 via OR (NOR)

gate 5. The other input to gate 5 is the enable signal for play-back-video via the MISSING PULSE DETECTOR 'i' Figure 1.

The counter 4 furnishes the enable signal to the data detector 'e' and gate 'g' Figure 1.

It may also be used to interrupt the microprocessor M Figure 1 to delay or inhibit writing of locally generated codes to tape if TUNER G output is being recorded and G TUNER is at the same Frequency as B TUNER. See $\overline{T1}$ interrupt Figure 3.

To cover the situation where TUNER G is providing a different OFF-AIR programme to that of TUNER B, it would be necessary to duplicate a portion of Figure 3 to detect this OFF-AIR DATA and signal microprocessor M not to write locally generated codes on top of OFF-AIR CODES.

Simply add a Notch Filter; Address Decoder; and another counter to Figure 1 on the video distribution out of IF Amplifier 'H'.

The counter thus newly appended to Figure 1 can send a $\overline{TO}$ interrupt signal to microprocessor M whenever a data frame is detected OFF-AIR via. TUNER G, Notch Filter and Address Decoder, exactly as per the description of Figure 3 using identical components. It is not required to decode the data arriving via TUNER G. It will be automatically recorded on tape and can be decoded and stored in Memory N Figure 1 when it is played back at some later time or date.

The concepts underlying the invention provide the means of determining to which channel the TV receivers are tuned at any moment in time by injecting a coded message into the antenna system such that a distinctive code by way of a signature is impressed upon or intermingled with the signals being received by each TV receiver from time to time.

In one preferred version of the invention; Figure 4 depicts the essential features.

PS represents the immediate source of the transmission being received by the TV receiver be it from an antenna or a cable terminal.

FS is a fast electronic changeover switch controlled by the logic system of Figure 4 which may include a microprocessor but which can be caused to briefly interrupt the received programme long enough to enable a coded message to be inserted in the stream of signals coming from source PS said message coming from encoder E which is shown in greater detail in Figure 5.

The coded message needs to be of such short duration that it becomes subliminal to the viewer and this message which is actually a signature for the channel being watched by the viewer may be either video or audio in character.

Figure 4 is representative of an audio signature system and for this case the Encoder E also enables a second electronic switch SW at precisely the same instant that switch FS is activated.

Switch SW cuts off the sound to the loudspeaker LS of TV receiver TV for a brief period of time momentarily diverting it to decoder D.

Whenever decoder D recognises a valid signature or code the logic system is providing the needed information regarding which channel is being watched at that point in time.

Switch SW is not always essential in that in another version of the invention decoder D may be permanently connected to the sound output of the TV receiver TV or may even be picking up the sound coming from loud speaker LS via a microphone. In this event the decoder is programmed to lock for an address code from the encoder E which precedes the signature code. The decoder will thus ignore normal programme audio and only become active when its address decode circuits signal that a channel signature is due to arrive.

Figure 5 explains in greater detail one way in which the appropriate signature may be generated by the encoder E so that whatever signature is recognised by decoder D becomes significant.

Read only memory ROM may be programmed to hold signature codes for up to several hundred channels. Such that for example address 1 of the ROM holds a signature for channel 1 and address N of the ROM holds the signature for channel N. Of course this form of address mapping is not mandatory.

Sequencer logic S is programmed to step the two oscillators 01 and 02 through all the channels one by one or it may in fact skip channels not being used in a particular locality and only those necessary may be programmed.

The appropriate oscillator 01 or 02 for a given channel is tuned by the tuning voltages V_{tv} and V_{tu} as switched by the sequencer S such that the frequency of the oscillator selected becomes identical to the frequency of the transmitter or cable system carrying the programme for that channel.

Upon attaining the frequency of each channel in its turn then the enable and $\overline{\text{Read}}$ outputs from the sequencer become active thereby operating switches FS and SW (fig 4) and the memory ROM.

As well as supplying the correct tuning voltage V_t to the appropriate oscillator 01 or 02 the sequencer addresses the read only memory to select the signature code appropriate to that channel and the $\overline{\text{Read}}$ signal causes that signature to be fed into the USART U which converts the signature into a bit-serial signature is converted by modem Mm into audio tones which are then imposed upon the oscillator selected via modulator Mr.

This results in the oscillator output being modulated with the audio content of the channel signature as a digital data stream. The switch-enable control signals are of sufficient duration such that switches FS and SW (fig

4) cause a momentary interruption to the reception of the programme coming from source PS of figure 4 and inject the signature into the TV receiver TV figure 4 antenna terminal at the same time diverting the sound output of the TV receiver TV from loudspeaker LS to decoder D figure 4.

Only if the TV receiver is tuned to the channel currently selected by the sequencer will there be an audio signature from the output of TV receiver. All other signatures for channels not being watched will be inhibited from reaching the decoder D figure 4 by virtue of the selectivity of the RF circuits of the television receiver TV figure 4.

Figure 6 shows the outline of another preferred version of the invention which obviates the need for an actual coded signature transfer. In this version only a marker pulse is required so that an economy of injected information is achieved resulting in greater numbers of channels available for identification within the available timescale.

The sequencer S acts exactly as in the previous example to inject a marker pulse at each step as it passes through all channel frequencies in turn. This marker pulse will only be detected when the frequency selected by the sequencer S matches the frequency to which the viewer has tuned receiver TV.

The channel identity data is now available as a direct channel count in the form of a digital code at the input to the random access memory RAM and when the Marker Pulse Detector R recognises a valid marker it activates the WRITE signal which permits the channel identity of the station currently being viewed to be recorded or otherwise processed.

The fast switch FS figures 4 and 6 is not mandatory as alternative methods of impressing the signature or marker pulse upon a continuous stream of itelligence coming from source PS are readily available.

Figure 7 is included to illustrate the concept of more than one receiver being monitored with different channels being watched.

In say a 200 channel cable environment the encoder E would step through or glide through 200 frequencies effectively pausing at each sufficiently long to transmit the code for that frequency or the marker. Typically the 200 markers could be served up in two milli-seconds or less which would be adequate for a measuring system requiring readings once per minute. 200 coded signatures would of course require a longer scan period.

In special cases readings for particular channels may from time to time be required to be done at say 3 second intervals. In such cases the encoder could be programmed to select those channels more frequently than the others at certain times of the day or as commanded by a central computer using radio to remote control the V.C.R./TV meter, or even using the cable system itself for such purpose.

In figure 7 PS, FS, and E have the same functions as they do in the earlier drawings.

The distribution amplilfier DA would be a normal part of the building TV system for say flats or units or multi-set households.

Decoders 1 to 12 are fitted with short term memory to latch the codes as and when received and to hold that code until a new one arrives.

Multiplexer MP is a convenient way of channeling the results to a common processor.

A complete scan of all available channels is only required occasionally.

Having determined that a given TV is tuned to channel 'n' then the injection oscillators may be held at the channel 'n' frequency until such times as the marker or code is no longer returned to the computer.

This signals a change of channel being viewed or an OFF condition and so a single complete scan is again called for.

CLAIMS

1. A system of television audience research comprising the steps of applying a signature at varying times to and into various parts of a television V.C.R. installation, including the steps of encoding said signature, detecting said signature in the installation in real time or at a subsequent time to obtain information as to programmes or channels being watched, recorded or being played back, such signature permitting collection of a range of data for the purpose of audience research.

2. Apparatus for a system of television research comprising signature generating means adapted to modulate oscillator means to provide a modulated carrier frequency related to one of a series of programmes or channels available to a television viewing audience, means adapted to substitute said carrier frequency for the UHF or VHF signals received by a television receiver tuner or V.C.R. tuner, when in use, means already present in the TV or V.C.R. to accept only the signature frequency to which the tuner is tuned to the exclusion of all other signature frequencies, decoder means to collect the output which is in the form of a demodulated signal representative of the original intelligence contained in the signature to establish whether the TV receiver or V.C.R. is switched to the channel or programme representative of said signature.

3. Apparatus as claimed in claim 2 wherein the oscillator means is variable to provide variable modulated carrier frequencies and signatures representative of all the channels available in the viewing area to ascertain the TV channel or programme being used.

4. Apparatus for a system of television research comprising microprocessor means for generating a signal marker adapted to modulate or switch a variable frequency oscillator to provide a modulated carrier or pulsed carrier, means for momentarily substituting said carrier for the antenna of a TV set or V.C.R., means already present in the TV or V.C.R. to accept said signal to the exclusion of all other signal frequencies, computer signalling means detecting the presence of a signal marker indicating the frequency to which the TV receiver or V.C.R. is tuned.

5. Apparatus for a system of television research comprising signature generating means adapted to modulate oscillator means to provide a modulated carrier frequency related to the video channel recording frequency of a V.C.R., means adapted to substitute the video content being recorded with said signature modulated carrier means, decoder means operable when a recording is played back whereby the signature is decoded to provide intelligence to a computer as to the time and channel from which the recording was made.

6. Apparatus as claimed in claim 5 wherein multiple decoder means are adapted to provide information from an equal number of TV receivers.

7. Apparatus as claimed in claim 5 wherein the output of said decoders is fed into a multiplexer to simplify the output.

8. Apparatus as claimed in claims 5 or 6 comprising means for recording said signature onto the V.C.R. tape synchronous with a specific event in time, said decoding means asynchronously identifying said specific event upon replay of the V.C.R. tape to signal to the computer the imminent arrival of said signature.

9. A system of television audience research comprising the steps of applyling a subliminal descriptive code to a tape during the duration of an advertising segment including the steps of encoding said tape with said code, decoding said tape on transmission or replay of said tape to obtain said information in relation to the nature of the programme or channel to permit data collection for the purpose of audience research.

0195639

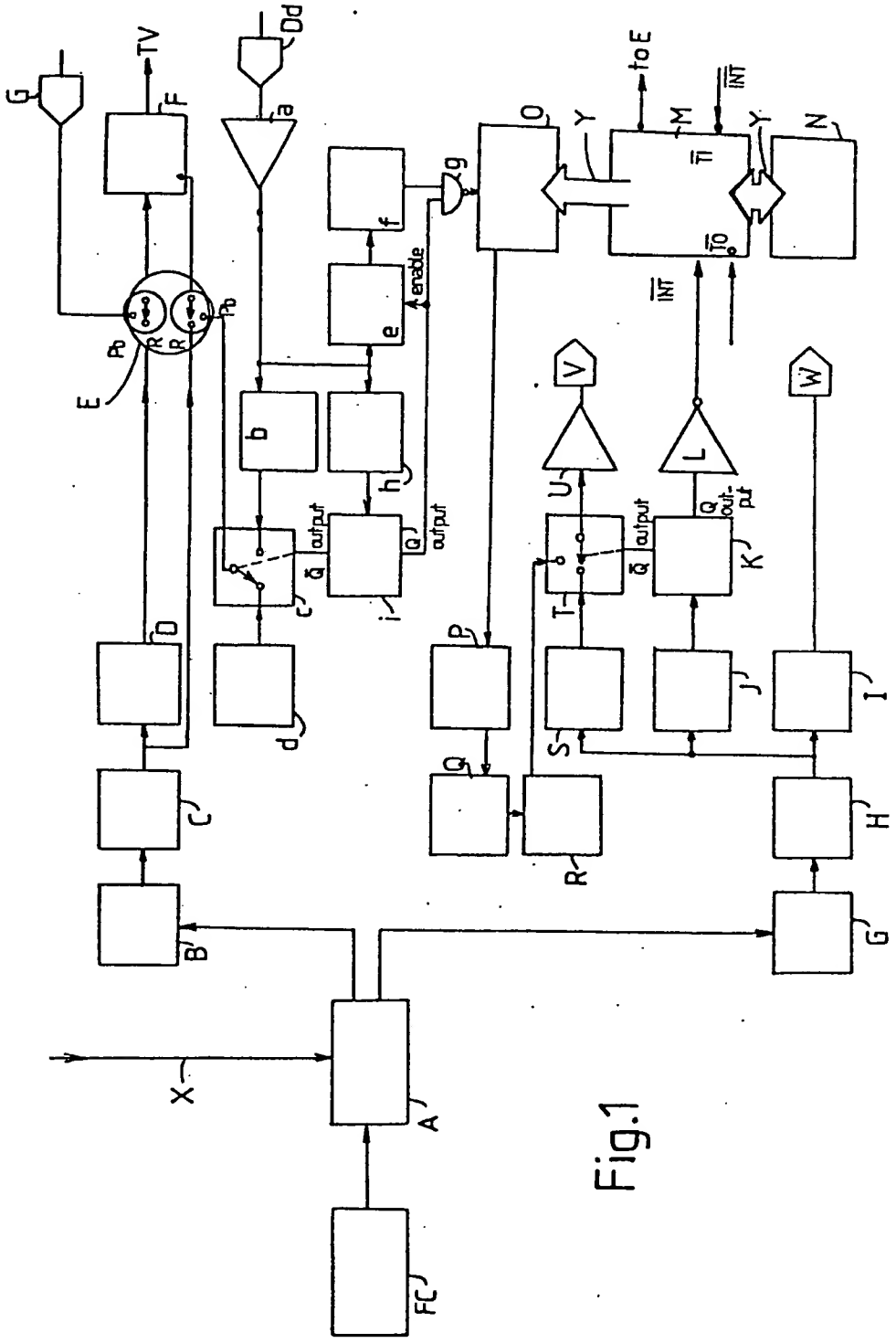
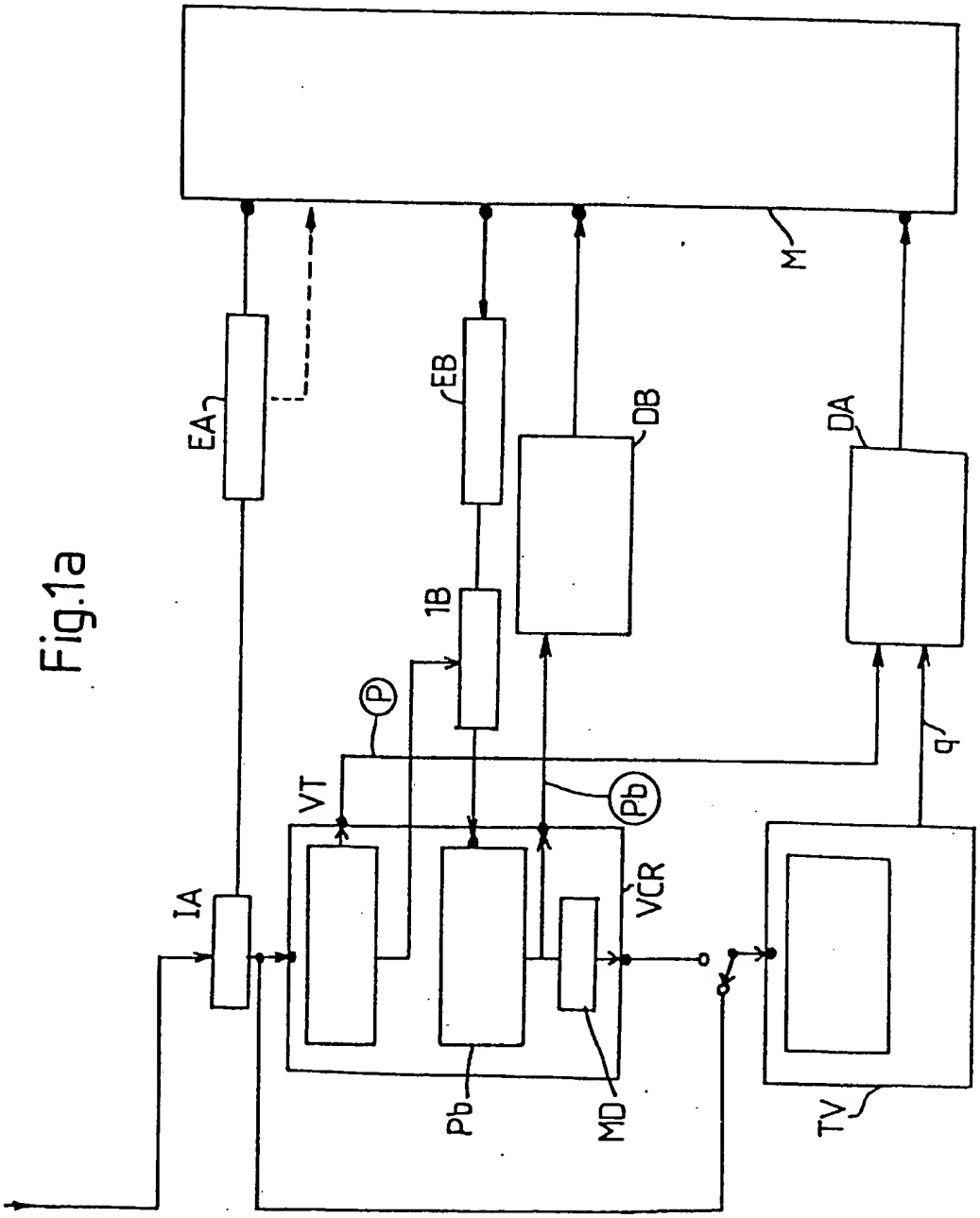


Fig.1

Fig.1a



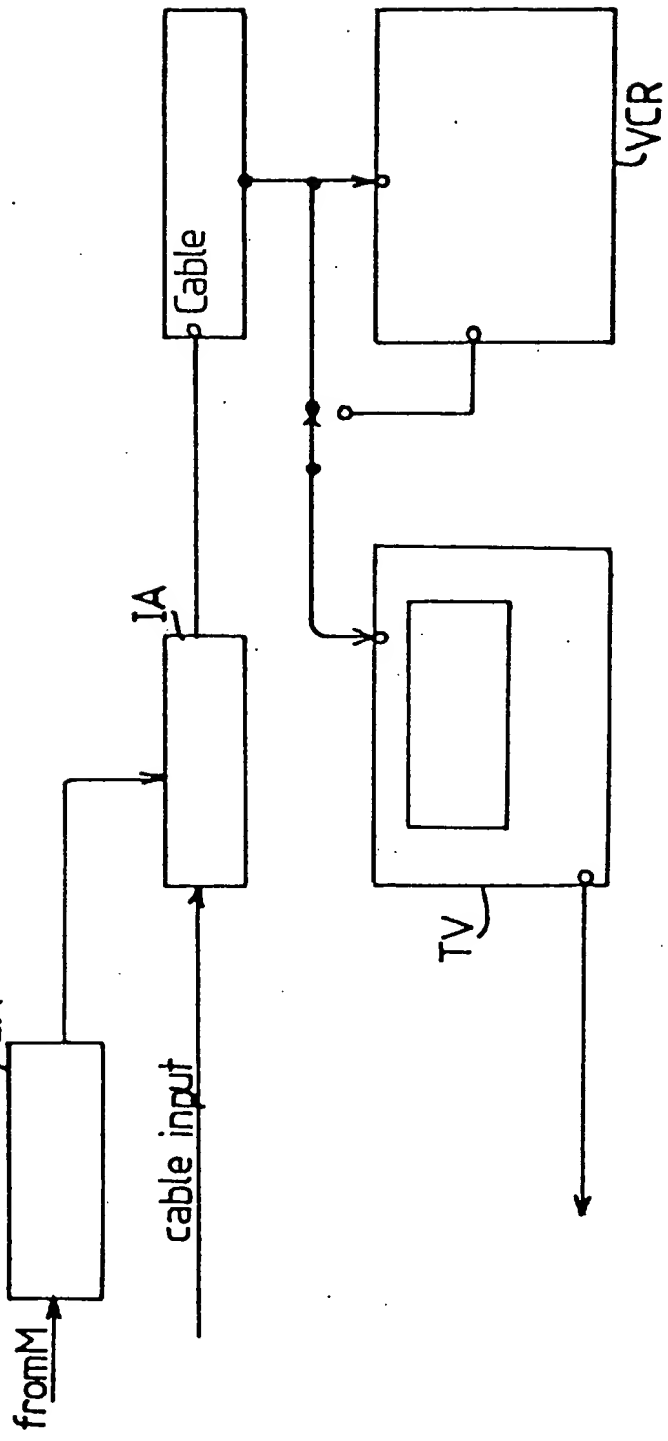


Fig.1b

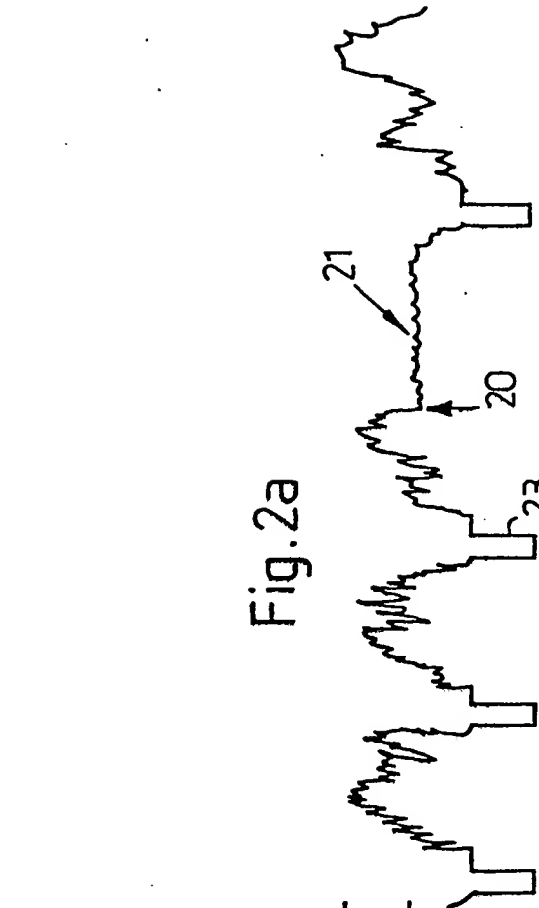

1000mv
600mv
300mv
PEAK WHITE LEVEL
GREY LEVEL
BLACK LEVEL
20
21
22
23

Fig.2a

Fig.2b

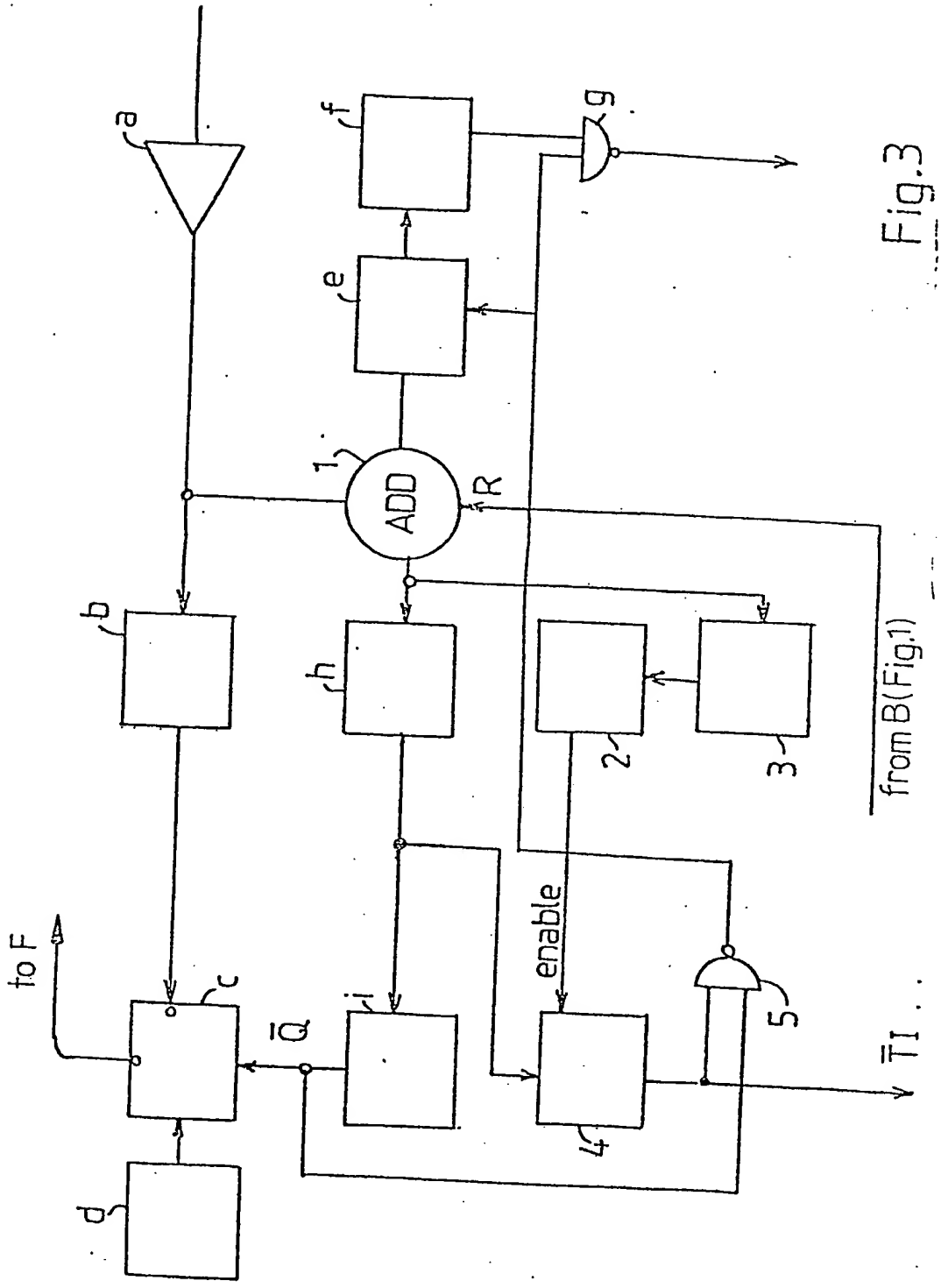
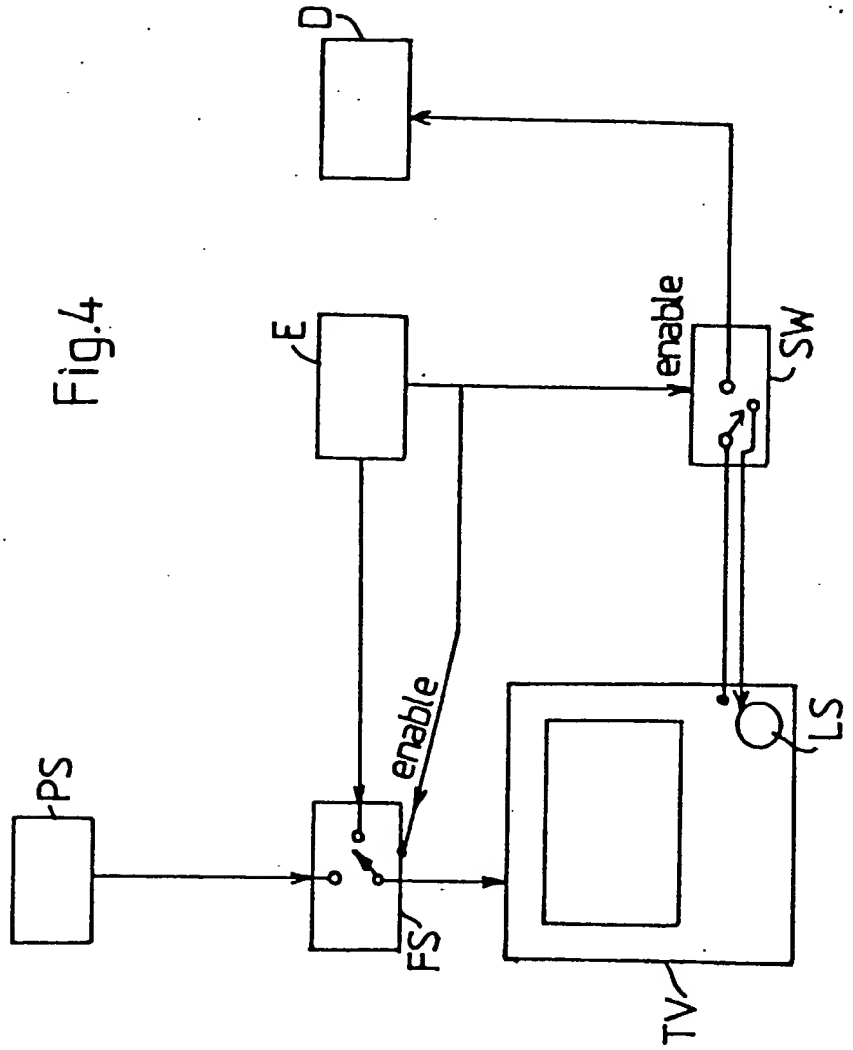


Fig.3

Fig.4



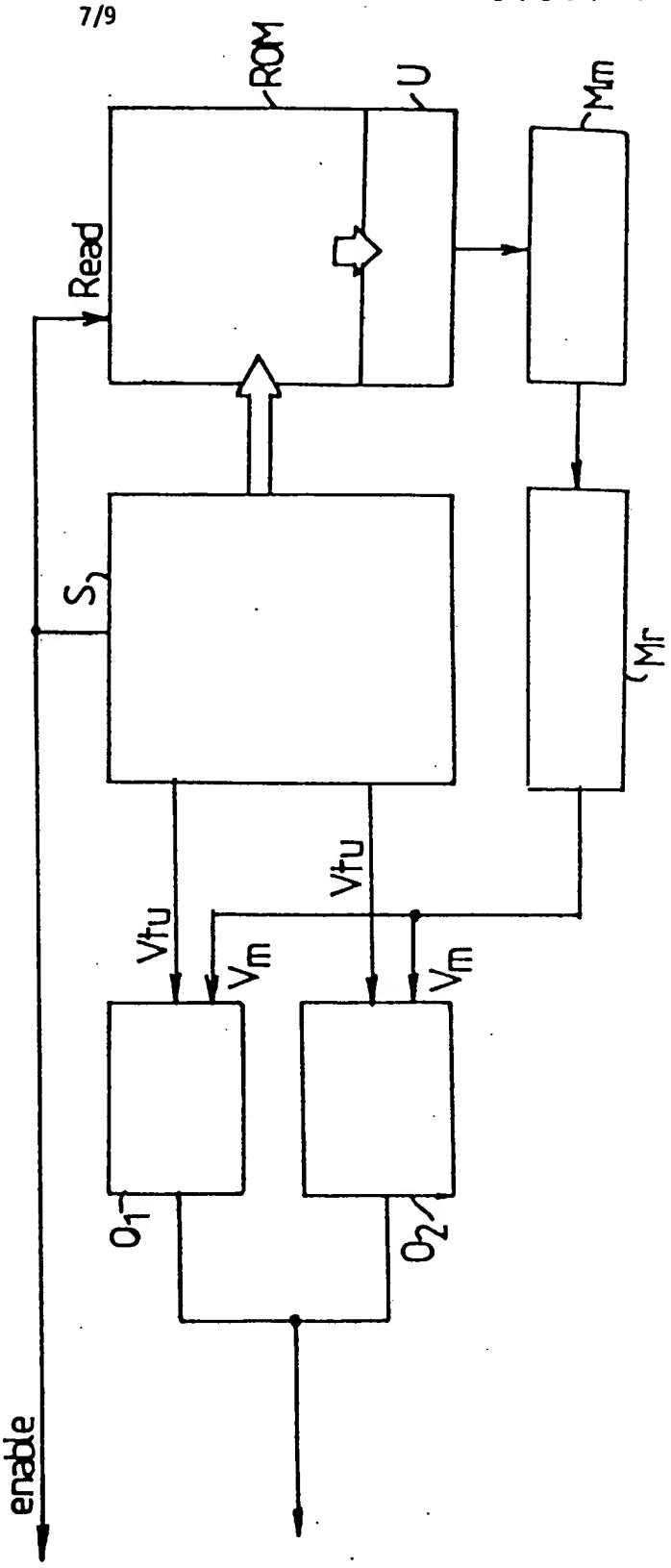


Fig.5

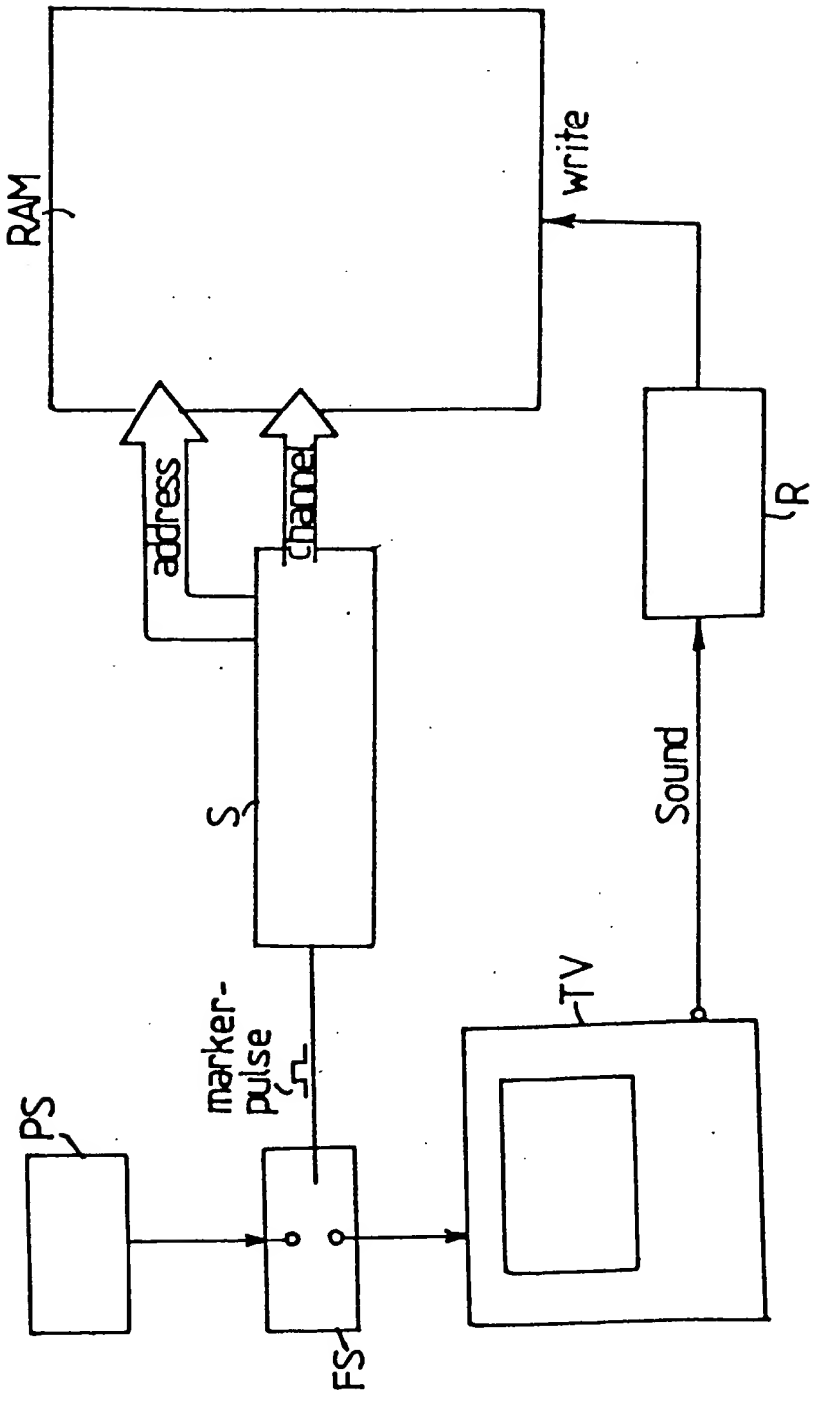


Fig.6

Fig.7